

## CLAIMS:

### 1. An antenna arrangement comprising:

at least two antennas for providing radio coverage to a plurality of user equipment in a predetermined area of a mobile communications network, the at least two different antennas being arranged to have different vertical properties to thereby provide different radio coverage in the predetermined area, and there being provided a plurality of frequencies for use in the predetermined area, the arrangement;

adjusting means for dynamically adjusting transmission properties of at least one of the antennas based on a distribution of users within a cell and frequency requirements for users within the cell; and

allocating means for dynamically allocating at least one user equipment to at least one group based on link characteristics of a user equipment.

2. An antenna arrangement according to claim 1, further comprising a group associated with at least one of the at least two antennas.

3. An antenna arrangement according to claim 2, wherein the at least two groups correspond to a regular layer and super layer of an intelligent underlay-overlay arrangement.

4. An antenna arrangement according to claim 1, wherein at least one frequency is dynamically allocated to each group.

5. An antenna according to claim 1, wherein a plurality of frequencies are allocated to the at least one group.

6. An antenna according to claim 5, wherein the plurality of frequencies correspond respectively to a set of regular frequencies and a set of super frequencies.

7. An antenna arrangement according to claim 6, further comprising an intelligent frequency hopping functionality provided between the regular layer and the super layer.

8. A method according to claim 5, wherein the plurality of frequencies are dynamically allocated to the at least one group.

9. An antenna arrangement according to claim 1, wherein the vertical properties are different down-tilts.

10. An antenna arrangement according to claim 1, wherein the vertical properties are vertical antenna gain figures.

11. An antenna arrangement according to claim 1, wherein the vertical properties of at least one of said antennas is variable.

12. An antenna arrangement according to claim 11, wherein the vertical properties are variable based upon the distribution of user equipment within the predetermined area.

13. An antenna arrangement according to claim 8, wherein available frequencies are allocated based upon a load in a group.

14. An antenna arrangement according to claim 13, wherein the load is dependent upon a number of mobile stations in the group.

15. An antenna arrangement according to claim 13, wherein the load is dependent upon an interference characteristics within the group.

16. An antenna arrangement according to claim 8, wherein frequency allocation to at least one antenna is dynamically controlled by the network.

17. An antenna arrangement according to claim 1, further comprising a channel which is allocated to the user equipment based on a carrier-to-interference measurement.

18. An antenna according to claim 17, wherein the channel is allocated based on a dynamic frequency and channel assignment.

19. An antenna arrangement according to claim 1, wherein the at least two different antennas provide radio coverage to the user equipment.

20. An antenna arrangement according to claim 19, wherein the user equipment is allocated to at least two groups.

21. An antenna arrangement according to claim 1, wherein a down-tilt of at least one of the antennas is fixed.

22. An antenna arrangement according to claim 1, wherein the predetermined area is a cell.

23. An antenna arrangement according to claim 1, wherein the predetermined area is a sector of a cell.

24. A method of controlling an antenna arrangement comprising at least two antennas for providing radio coverage to a plurality of user equipment in a predetermined area of a mobile communications network, the method comprising:

arranging at least two different antennas to have different vertical properties to thereby provide different radio coverage in a predetermined area;

providing a plurality of frequencies for use in the predetermined area;

dynamically adjusting transmission properties of at least one of the antennas based on a distribution of users within a cell and frequency requirements for users within the cell; and

dynamically allocating each user equipment to at least one group based on link characteristics of a user equipment.

25. A method according to claim 24, further comprising providing a group associated with at least one of the at least two antennas.

26. A method according to claim 25, wherein the providing step comprises corresponding the at least two groups to a regular layer and super layer of an intelligent underlay-overlay arrangement.

27. A method according to claim 26, wherein the providing step comprises allocating a plurality of frequencies to the at least one group.

28. A method according to claim 26, wherein the providing step comprises corresponding a plurality of frequencies to a set of regular frequencies and a set of super frequencies, respectively.

29. A method according to claim 28, further comprising the step of providing an intelligent frequency hopping functionality between the regular layer and the super layer.

30. A method according to claim 24, wherein the arranging step comprises arranging the at least two different antennas to have different vertical properties, wherein the vertical properties of at least one of said antennas is variable.

31. A method according to claim 30, wherein the arranging step comprises arranging the at least two different antennas to have different vertical properties based upon the distribution of user equipment within the predetermined area.

32. A method according to claim 31, wherein the allocating step comprises allocating an available frequency based upon a load in a group.

33. A method according to claim 24, further comprising allocating a channel to the user equipment based on a carrier-to-interference measurement.

34. A method according to claim 33, wherein the channel allocating step comprises allocating based on a dynamic frequency and channel assignment.